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PRACTICAL OBSERVATIONS BASED ON EIGHT HUNDRED THYROIDECTOMIES*

By A. B. COOKE, M. D.
Los Angeles

DISCUSSION *by Wallace I. Terry, M. D., San Francisco; Joseph K. Swindt, M. D., Pomona; Charles T. Sturgeon, M. D., Los Angeles.*

AMONG the many wearisome features with which the medical literature of the present day abounds, statistics and statistical tables probably hold first place. It is not my purpose to offend in this respect. The great labor involved in compiling statistics, and the reluctance on the part of the average reader to dig out any nuggets of truth they may chance to contain, restrain me from inflicting them upon you. Then, too, I recall the pet saying of a former blunt-spoken colleague with which he was wont to open his discussion of such papers, to the effect that "there are just three kinds of lies: plain lies, d----d lies, and statistics."

Instead, I propose to call attention, under a number of separate headings, to certain practical deductions drawn from a personal experience of more than eight hundred thyroidectomies, covering my work up to July of the present year, and to emphasize these deductions, according as they have seemed important and valuable to me.

First, to dispose of certain general considerations underlying such a study: sex, age, type of case, diagnostic points, etc.

ETIOLOGIC FACTORS

Sex.—Only 75 per cent of my cases have been encountered in females. This is less, by some 15 per cent, than is ordinarily reported. I can offer no explanation of the discrepancy, unless it is due to the fact that it has always been my custom to advise surgical removal in all cases of adenomatous goiter, where no positive contraindication existed. As is well known, this type of goiter is much more prevalent in the male than is Graves's disease. Several reasons have seemed to me sufficient to justify such routine advice: (1) the adenomatous thyroid is markedly refractory to other methods of treatment; (2) if not giving rise to toxic symptoms at the time, it is very apt to do so later; (3) while the incidence of malignancy of the thyroid is not large, it is generally accepted that it almost invariably develops in the adenomatous gland.

Age.—The youngest patient in this series was nine years of age—a severe case of true exophthalmic goiter. The eldest patient was seventy-eight years old. Both were females. The two decades between thirty and fifty have supplied about 65 per cent of my cases, the sixth and third decades following in the order named.

Social Condition. — I have not observed that social condition plays any material part in determining the incidence or type of thyroid disease except, perhaps, as poverty and mental worry seem to favor the occurrence of exophthalmic goiter. The preferred age for true Graves's disease is known to be the years of active productive life, when mental and emotional burdens are likely to be most numerous and weighty. Practically all the cases of thyroid adenoma met with in Southern California appear to have been of imported origin. I do not remember to have seen a case in a native-born patient who had spent the years of childhood and adolescence in the southern part of the state.

In spite of the most careful observation, I have not yet become convinced that there is no other difference between Graves's disease and toxic adenoma than a difference in the degree of the hyperthyroidism. True, in most cases of toxic adenoma, hyperplasia is present also to some extent. But there are clinical features in which the two vary so widely, and so constantly, that it is rather difficult to think of them as merely different expressions of the same pathologic entity.

Type of Case.—I have operated on adenomatous goiters in a proportion of about three to one of exophthalmic goiter. Altogether, I have had only five malignant cases—a percentage of but six-tenths of one per cent. I can suggest no reason for this fortunate experience other than that luck has been with me.

DIAGNOSIS

Just a few words on diagnosis. It is important to know all that can be learned about the patient, as well as the malady, in every case. The time spent in eliciting the history in detail is well spent. The presence of a visible or palpable en-

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largement is not essential to a correct diagnosis of thyroid disease. A given case may even exhibit hypofunction, as shown by the basal metabolism reading, and yet be a genuine case of hyperactivity. In such instances the area of hyperplasia may be so limited or so located as to escape detection until the specimen reaches the pathologist. These border-line cases will often tax the diagnostic skill of the clinician to the utmost. Indeed, I am persuaded that patients of this class far too often fail to obtain the relief they seek, and should have, the ranks of the so-called neurotics thereby receiving many unhappy recruits.

PREPARATORY TREATMENT

The proper kind and duration of the preparatory treatment depend upon the nature of the disease process, the amount of damage it has already done, and the general condition of the patient. Adenoma cases, if nontoxic, usually require a minimum of delay and only the ordinary preparatory measures. When the psychic factor can be disregarded, the majority of these patients may be operated on to advantage under local anesthesia. In toxic adenoma it will often be found that more or less damage has been suffered by the vital organs, particularly the heart, due to the long and insidious course of the disease, sometimes extending over a period of years. Here arrhythmia, fibrillation, or other abnormal condition may necessitate prolonged rest in bed and complete digitalization. Obviously, inhalation anesthesia is to be employed in this class of patients with the greatest circumspection.

With a very few exceptions, I have derived no benefit from the administration of any form of iodin in adenomatous goiter. On the contrary, I am sure that more than once I have seen it do definite harm. Similar comments apply, and with equal force, to radiation as a preparatory treatment. When either of these agencies, iodin or radiation, is resorted to, the patient should be kept under close observation, preferably in the hospital.

The preparatory treatment in Graves's disease is a more complicated problem but, generally speaking, not a more difficult one. Here Lugol's solution is usually magical in its effect, provided that the patient has not been previously rendered iodin-immune by unwise therapy. When it fails, as will occasionally happen even when employed for the first time, radiation may be resorted to with some hope of temporary palliation. But I wish to emphasize in this connection that neither iodin nor the roentgen ray is to be regarded as curative in exophthalmic goiter, though both may sometimes serve useful purposes in selected cases.

I have practiced preliminary ligation only a few times in the past eight years or so. As a rule the iodin remedy accomplishes the same beneficent result with less danger to the patient. When iodin fails, however, ligation may be done under local anesthesia in a matter of ten or fifteen minutes. provided, of course, that the operator knows his anatomy thoroughly.

As experience in handling a given disease problem increases, one is apt to formulate for himself certain rather fixed principles of guidance. Let me cite several of my own, with reference to the management of hyperplastic goiter. I am strongly averse to operating while the basal metabolism remains as high as plus 50, and the pulse rate, taken during sleep, remains persistently above 100. And I decline to operate, in any event, when the toxicity is definitely on the increase.

Undue loss of blood at operation seems to be especially detrimental in this type of case, probably because the patient is so often already partially dehydrated. And, unfortunately, this is the type in which hemorrhage is most likely to occur, due to increased vascularity of the parts. If it does not seem necessary to administer intravenous therapy prior to the operation, I insist that it shall be available for immediate use during the surgical work or upon completion of the operation.

Anesthesia.—I am convinced that general anesthesia should be employed in the majority of toxic cases, and particularly in Graves's disease. Complete unconsciousness is a distinct protection to these patients, for the reason that they are already overstimulated, and the sights and sounds of the operating room induce unfavorable reactions. In certain cases where the cardiac condition points to the advisability of local anesthesia, I endeavor to secure the desired state of unconsciousness by increasing the preliminary dosage of barbiturate and opiate.

The association of a skilled anesthetist I regard of paramount importance in thyroid surgery. I do not use ether in this work.

OPERATIVE PROCEDURES

The idea of the permanent scar to follow should be kept in mind both in making the incision and in closing it. It should only be long enough to permit speedy, accurate work, and the skin edges should be approximated with meticulous care. As experience increases, it will be found that shorter and shorter incisions will suffice. Patients appreciate small scars when they are to remain permanently visible, as in the case of women.

Section of the ribbon muscles is rarely necessary. When the tumor mass is unusually large, or is substernal in location, the additional room may serve to facilitate delivery of the tumor and thereby safeguard the patient. Since no appreciable damage results, one should not hesitate to adopt the expedient when indicated.

How much gland tissue is to be left? This is a troublesome question, and an answer sufficiently definite to form a reliable clinical guide is not possible. A remarkably small remnant of normal gland substance often proves adequate to maintain function perfectly, because nature usually meets the need promptly by compensatory hypertrophy. Personally, I feel that it is preferable to leave too little rather than too much gland. The daily administration of a thyroid tablet is certainly a lesser evil than a second operation. This is an especially sound principle in toxic adenoma, for one can never be absolutely sure that a lobe or area normal in appearance does not harbor additional foci, so small or so deeply placed that they cannot be

detected. It is estimated that recurrence takes place in some two or three per cent of all operated cases. This is a much larger proportion than has occurred in my own work, due solely, I am sure, to the fact that I believe in and follow the principle here set forth.

Hemostasis should invariably be as complete as possible before any suturing is done. No bleeding vessel is too small to be tied. I lost one patient from hemorrhage within a few hours of the operation, and was barely in time to rescue another from death by pressure suffocation due to slow oozing beneath the fascia, the nurse having failed to recognize the danger.

Drainage.—I have long since convinced myself that adequate provision for drainage is a wise precaution. Not only does it serve to give timely warning of imperfect hemostasis, but it also prevents troublesome accumulation of serum at subsequent stages. The period of after-attention may be somewhat prolonged by this item of technique; but such consideration is negligible as compared with the enhancement of the patient's safety and comfort.

Complications.—Collapse of the trachea is the most alarming complication met with in thyroid surgery. It is most apt to occur in long-standing cases of intrathoracic goiter of adenomatous type. Prolonged pressure occasionally results in partial absorption of the tracheal rings, and collapse ensues when the pressure is suddenly released. Prompt recognition of the true nature of the trouble and immediate tracheotomy are the only reliable means of averting disaster. I lost a patient on the table many years ago from failure to realize the danger in time; since then I have succeeded in saving several lives by prompt intervention. It is a good thing to know that a tracheotomy tube always has a place on the instrument tray.

Other accidents and complications of more frequent occurrence include hemorrhage, injury of the recurrent laryngeal nerves, injury or removal of one or more of the parathyroid bodies, and damage to the trachea or esophagus. Clean-cut, accurate working knowledge of the anatomy of the neck is obviously the only dependable means of avoiding these pitfalls.

Time.—The time consumed in the operation is a vastly important consideration. Speed, but not haste, is the desideratum. The operator who habitually consumes from two to four hours in the average thyroidectomy would do well to confine his attentions to other portions of the body, or better still, perhaps, to a less exacting occupation. The difference between one, and two or more hours in the operating time may well mean the difference between life and death in certain cases.

POSTOPERATIVE CARE

Aside from a few simple routine procedures, no such thing as a stereotyped system of postoperative care can be laid down. The kind and degree of reaction and the general condition of the patient must determine this. I always order the Fowler position, the immediate application of an ice-collar, and the starting of proctoclysis or intravenous glucose as soon as the patient is returned to bed. Occasionally, a transfusion will best meet the indications, and such possibility should always be anticipated in highly toxic cases.

The quantity of postoperative opiate to be used varies widely. Often none is required. Nothing is allowed by mouth for the first twenty-four hours, and absolute quiet under close observation is enjoined in all cases.

Should acute hyperthyroidism supervene, it is best met by the external application of cold, and sufficient morphin to control pain and restlessness.

(The condition just referred to is not to be confused with surgical shock.)

IN CONCLUSION

Now, may I be pardoned if I add a few words of a statistical nature? My series of thyroidectomies shows a total mortality of twelve cases—approximately one and one-half per cent. This includes all cases operated on in my clinic at the Los Angeles General Hospital, about two hundred in number. As may be readily understood, a goodly proportion of these patients were far from first-class risks. The mortality rate for private patients, some six hundred in number, has been maintained at about one per cent.

The twelve deaths may be listed as follows:

Postoperative hemorrhage	1
Collapse of the trachea (on the table)	1
Surgical shock (on the table)	1
Cardiac failure (twenty-four hours postoperative)	1
Malignant cases (one on the table)	2
Acute hyperthyroidism	6

Twice I have been so fortunate as to run a series of one hundred consecutive cases without a fatality.

Finally, let me say that, in my opinion, surgical judgment is the most important factor contributing to the success of thyroid surgery. A good operative technique may be acquired by practically anyone. But it is the possession of that intangible asset, surgical judgment, which distinguishes the surgeon from the mere operator.

947 West Eighth Street.

DISCUSSION

WALLACE I. TERRY, M.D. (384 Post Street, San Francisco).—Doctor Cooke has contributed an excellent paper on the surgery of the thyroid gland based on his own experience. As it was read before a general medical meeting, he did not, of course, give more than a general outline of his own observations as to etiology, diagnosis, pathology and treatment of goiter. There are so many details which a surgeon would like to know that I trust Doctor Cooke will contribute a further paper to some special surgical journal.

While I am in accord with most of his conclusions, I feel that his statement regarding the time consumed in performing a goiter operation is rather harsh. Anyone who had the great privilege of watching the late Doctor Halstead of Baltimore do a goiter or other operation realized that the time element was a relatively minor factor, provided that meticulous hemostasis, delicate handling of tissues and skillful anesthesia were employed. Hemorrhage, trauma, and poor anesthesia have more to do with the production of shock and other operative or postoperative complications than has the mere prolongation of an operation.

The use of drainage, except after the removal of deep-seated, particularly substernal goiters, it seems to me, is seldom necessary. I am confident that the author would only rarely use drainage in other clean operations. Thorough flushing of the wound with Ringer's solution, warmed to about 35 degrees centigrade, before final closure, will bring to light any untied bleeding points, and the use of very fine suture material will minimize wound reaction.

Doctor Cooke is to be congratulated on his low mortality rate, which will steadily decrease now that acute hyperthyroidism is better understood; for half of the deaths in his series were due to it.

The percentage of malignant goiters varies considerably in different localities—from less than one per cent to over seven; and in view of the fact that malignant goiter nearly always occurs on the basis of a preexisting adenoma, Doctor Cooke should calculate his incidence as five cases in some six hundred adenomatous goiters, his proportion of adenomas to hyperplasia having been three to one.

It is interesting that he does not recall seeing any natives of the southern part of the state originate adenomatous goiters. It is apparently corroborative evidence for the iodin deficiency theory of their etiology.

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JOSEPH K. SWINDT, M. D. (279 South Thomas Street, Pomona).—In a review of these eight hundred cases of goiter, we find Doctor Cooke's experience leads him to conclusions which represent quite accurately the present opinions of most of our authorities on thyroid surgery. His mortality record, no doubt, indicates a fine operating-room technique, but this must also depend very largely upon a high degree of cleverness in the selection and preparation of the operative risks. I should like to elaborate upon his discussion of the various elements of the thyrotoxic state and the manner in which the degree of toxicity may be determined.

There are four groups of criteria by which the thyrotoxic status may be investigated and the degree of toxicity estimated. These concern the circulation, nutrition, elimination, and nervous equilibrium of the patient.

The circulation is fundamentally dependent upon the integrity of the myocardium. The pulse rate, blood pressure reading and electrocardiogram may give actual physical evidence of the condition of the myocardium; but much more significant evidence of compensation or decompensation of the goiter heart is to be derived from the absence or presence of such clinical signs as dyspnea, cyanosis, and edema.

The nutritional status involves the metabolic balance between storage and waste. Loss or gain of weight and basal metabolic readings are indicators of great value, but must be interpreted largely in the light of the water balance of the patient. To be waterlogged is equally as dangerous as to be dehydrated, and either condition is evident to clinical inspection. Glucose storage in the liver must be maintained by the intake of carbohydrates in abundance, and if waste is spilled over a low kidney threshold it should be checked by insulin.

Excretory competence depends on the functional capacity of the liver, kidneys, bowels, and skin; all of which are profoundly disturbed in long-standing thyroidism, especially in the insidious adenomas. The icteric index and the kidney function tests are indicative of impairment long before gross clinical evidence can be detected. Nausea and diarrhea should be sensed as compensatory processes, suggesting failing function in liver and kidney.

Thyrotoxicosis is indeed a nervous break-down, and patients so afflicted are often on the verge of a mental collapse, and need only the postoperative thyroid storm to drive them mad. This should be recognized and relieved, or at least anticipated before operation is performed. Some time before operation, the patient's reaction to sedatives should be tried out, so that the surgeon may have one at hand known to be agreeable and effective, to secure comfort during the storm.

Willard Bartlett recently wrote an article on "An Original Method of Estimating the Thyrotoxic State" (*Southern Medical Journal*, January, 1932). The method is based on the ability of a toxic patient to hold his breath in inspiration and expiration. The average normal individual holds his breath about forty seconds on inspiration and twenty seconds on expiration, a ratio of about two to one; while the toxic individual holds his for about twelve and ten, respectively, a ratio of about one to one. As the toxicity in a given patient lessens, this ratio of one to one will gradually approach that of two to one. Bartlett's studies reveal the fact that voluntary apnea may be regarded as a very good index of the circulatory status, self-control, basal metabolism, and other components of the clinical picture. The test is conducted under the same conditions as a basal metabolism test. It is, as Bartlett says, to some extent an all-embracing test, perhaps the most useful of all those at our command in estimating the condition of the thyrotoxic patient; and it costs nothing.

The toxic goiter case should never be subjected to an emergency operation. With a careful estimation of the degree of toxicity as I have described, and an equally carefully executed plan of preparatory treatment, it should be possible to maneuver any case into a position where there is vital capacity to endure a thyroidectomy. If this cannot be done the operation will be useless.

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CHARLES T. STURGEON, M. D. (1930 Wilshire Boulevard, Los Angeles).—Doctor Cooke has presented a very clear résumé of his work, and I wish to congratulate him; first, in that it is not a statistical report, and second, that the mortality was as low as one and one-half per cent. When one considers that many of his patients were operated upon at the General Hospital, and that the majority of patients seen there are very ill and poor surgical risks, it is an excellent record.

Doctor Cooke reports a malignancy of only six-tenths of one per cent, and I agree with his statement that this can only be attributed to "good luck," as the various clinics report a percentage between two and three per cent.

An important question that arises in thyroid surgery is how to ascertain the amount of gland that should be left. There is no definite rule that one may follow, as this varies with individuals and in different types of goiter. The essential medium to be attained is between too great removal of the gland, with the resultant production of myxedema, or too little removal and the establishment of persistent hyperthyroidism. Therefore, it is only by experience and a careful postoperative follow-up of cases that you can formulate a workable theory, though there are a few guiding facts that can be stated.

1. In those cases of hyperplastic goiter where the symptoms respond very rapidly to iodin therapy and when, at the time of the operation, the cut surface of the gland appears grayish so that one knows that a certain amount of involution has taken place and the involution of the remaining gland following surgery will probably be complete; therefore, more of this gland should be left. In those patients who have not responded to iodin therapy, and in whom at the time of the operation the cut surface of the gland appears reddish brown, cellular and vascular in character, signifying that involution has not taken place, a lesser amount of thyroid tissue should be left.

2. In patients with adenomatous goiters considerable gland should be left, due to the fact that the remaining gland tissue is usually not very active and there is the danger of myxedema following surgery.

3. When operating upon elderly persons, relatively more thyroid tissue should be left than in young persons.

4. In hyperthyroidism in children, especially if the operation takes place before puberty, one should leave a larger portion of gland than that left in adults, as involution takes place in the hyperplastic gland just as definitely as in the adults, and myxedema is prone to follow if too much gland is removed. If one should

err, it is better to err on the side of conservatism, and so have a slight remaining hyperthyroidism rather than a myxedema.

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DOCTOR COOKE (Closing).—I greatly appreciate the expressions of all who have participated in the discussion. There is no occasion for self-defense, but I should like to make a few brief comments in closing.

Doctor Terry thinks my estimate of the proper time to be consumed in a goiter operation rather harsh. My statement was that speed, but not haste, is desirable; that the operator who habitually consumes from two to four hours in the average thyroidectomy—and there are such—imposes an undue hazard. Those sentiments I wish to maintain. In the average case the time required for the complete operation should not often exceed one hour. While hemorrhage, trauma, and poor anesthesia are certainly factors in the production of shock and other complications, I feel that the time element is equally, perhaps more, important. And this in spite of the surgical deliberateness of Doctor Halstead who, it must be remembered, passed from the arena of action before any large amount of goiter surgery was being done. If ideal conditions could be secured in every patient prior to operative attack, more or less additional time might not be of particular significance. But in toxic cases the threshold of resistance is so lowered that prolongation of the trauma and anesthesia beyond the minimum required for thorough work seems to me both unwise and unsafe.

Doctor Terry deprecates the use of drainage on the ground that it is not employed in other clean surgery. No other type of operation can be properly compared with thyroidectomy, where the drainage is of a special kind and excessive in amount. Drainage adds nothing to the danger involved. It does add an element of precaution, and it does promote the comfort of the patient. Doctor Terry's extensive experience makes what he says about Ringer's solution well worth considering.

I am in accord with all that Doctor Sturgeon says except his guiding point No. 2. In adenomatous goiter, it is often impossible to tell, either by sight or touch that small adenomas are not present in apparently normal gland tissue. To leave them is to invite future trouble. Myxedema is not the formidable condition it was wont to be regarded. As stated in the paper, I consider the swallowing of a tablet of thyroid extract several times a day a much less evil than a second operation. In this I am quite sure that most patients would enthusiastically agree.

Doctor Swindt's contribution to the discussion is most valuable. I am glad that he emphasized the importance of the preparatory treatment. In spite of the most careful efforts in this direction, however, the ideal condition cannot always be established. My own belief is that operation should not be withheld, if it offers the patient a reasonable chance in an otherwise hopeless case.

MALPRACTICE—AS AN ATTORNEY SEES IT*

By RALPH E. SWING, ESQ.
San Bernardino

FEW lawyers, not many medical men, and no laymen, understand the conditions under which a physician, surgeon or dentist may be liable for improper treatment of a patient; and because of such lack of knowledge a great number of actions are improperly instituted against the members of these professions. Such liability is predicated upon a branch of negligence termed "malpractice," which means bad or unskillful practice, resulting in injury to the patient.

* Paper is by State Senator Ralph E. Swing.
* Read before the San Bernardino County Medical Society February 6, 1934.

Malpractice may result from lack of sufficient knowledge and skill of the subject or situation confronting a physician, or from a failure to properly apply the knowledge and skill which a physician does possess. The rules covering malpractice actions are applicable alike to physicians, surgeons, and dentists; and while in this discussion I shall for brevity, refer only to physicians, what is said will be equally applicable to the other two professions.

CIVIL LIABILITY IN MEDICAL PRACTICE

The liability of a physician for malpractice may be either civil or criminal, but in this discussion I will only deal with the questions involving civil liability.

There are few actions for malpractice which are predicated solely upon a lack of knowledge or skill, although in these days of specialists, and of new and advance treatments, it may very well be a matter of some consequence.

In my experience, I have come in contact with but few cases which could finally be traceable to a lack of knowledge. In one of such actions a dentist had extracted an ulcerated tooth and, apparently due to lack of knowledge in the matter of administering hypodermics, he failed to exercise the degree of skill requisite for properly administering a hypodermic injection, and as a result thereof the patient suffered an infection which resulted in serious consequences, and in a substantial judgment against the dentist. His failure to take the proper precaution was due primarily to a lack of knowledge.

VALUE OF CONSULTATIONS

As a matter of caution, I can only say that when a physician is confronted with a situation with which he is not familiar he should not hazard a guess as to what to do. If the subject is one requiring the advice of experts, he should at once avail himself of their advice and services, or else refer the patient to someone possessing the requisite skill.

It has been repeatedly said that human life is too precious to be entrusted to a person lacking in skill or knowledge, and that when a physician is face to face with a critical condition that is new to him or that cannot be readily diagnosed, he should not venture a treatment or perform an operation on a mere hazard that it may be right. The rule that physicians are not liable for errors in judgment will not be available to him under such circumstances.

BASIS OF MOST MALPRACTICE CLAIMS

The great majority of cases predicated on malpractice grow out of the assumed negligence or failure to do or not to do the things which the condition of the patient required should or should not be done, and it is this particular phase of the subject to which I wish to direct your attention.

Permit me, however, first to say that a bad result is no evidence of negligence; yet in nine cases out of ten, the laymen, and not infrequently the physician himself, mistakes a bad result as conclusive evidence of negligence. It is reasonably